Atmospheric Infrared Sounder (AIRS) Data Products at GES DAAC

by Carrie Phelps

The Earth Observing System (EOS) Aqua spacecraft launched May 4, 2002, carrying a new suite of advanced instrumentation designed to collect precise information about Earth's water cycle and energy budget. The effects of the data from this platform are greatly anticipated — from extending the range of accurate weather prediction to assessing global climate variations and feedback.

Three of the Aqua instruments, the Atmospheric Infrared Sounder (AIRS), the Advanced Microwave Sounding Unit (AMSU–A), and the Humidity Sounder for Brazil (HSB), are closely coupled to derive useful geophysical parameters for an extensive range of topics in atmospheric research. The AIRS-AMSU–A-HSB science objective is to observe the entire atmospheric column from the surface to the top of the atmosphere and to accurately characterize atmospheric circulation, temperature profiles, water content, and greenhouse gases. The three instruments will accomplish this by measuring radiation using a wide range of visible, infrared, and microwave wavelengths.

The **AIRS** instrument is a high resolution spectrometer with 2378 bands in the thermal infrared spectral region (3.74–15.4 µm) and 4 bands in the visible and near infrared spectral regions (0.4–1.0 µm). These ranges have been specifically selected to determine atmospheric temperature profiles with an accuracy of 1°C for every 1 km layer in the troposphere (1°C for every 4 km layer in the stratosphere) and humidity profiles with an accuracy of 10 percent in every 2-km layer in the troposphere. This capability matches or exceeds that commonly obtained by radiosondes (surface launched weather balloons), yet with extraordinary global coverage and frequency, especially over typically data sparse regions such as oceans and the poles.

AMSU–A is a 15-channel microwave sounder that also derives global atmospheric temperature and water from the surface up to 40 kilometers, but with coarser horizontal resolution than that of AIRS. Information from AMSU–A in the presence of clouds is used to correct the AIRS infrared measurements for the effects of clouds. Likewise, **HSB** is a 4-channel microwave sounder providing supplementary water vapor and liquid water data from the surface up to 10 kilometers. If cloud cover is too dense for AIRS infrared retrievals, the microwave measurements from AMSU–A and HSB can be used to provide the temperature and humidity profiles, albeit with lesser precision.

Now Available — AIRS Level 1B Data Products

The EOS Data and Information System (EOSDIS) is receiving the AIRS, AMSU–A, and HSB data and generating the AIRS data product suite using retrieval algorithms developed by an international science team led by Dr. Moustafa Chahine at NASA Jet Propulsion Laboratory (JPL). The data are produced in HDF-EOS format and will generally become available from the Goddard Earth Sciences Distributed Active Archive Center (GES DAAC) 30–36 hours after satellite measurement.

Calibrated, geolocated radiances (Level 1B data) from AIRS and AMSU–A may now be ordered from the GES DAAC beginning with data date March 12, 2003. Also, corresponding quality assurance information for AIRS (both visible and infrared products) is available from the GES DAAC. Cloud cleared radiances and other geophysical parameters (Level 2 data) are projected to become available in July 2003. Level 3 products (means, standard deviations, gridded data) are planned, but the date of availability is yet to be determined. Raw instrument data counts (Level 1A) will not be distributed.

The tables on page 2 list the full set of selected parameters, file sizes, and spatial resolutions for the AIRS, AMSU–A, and HSB Levels 1B and 2 data products.

There are three AIRS Level 2 product files titled, respectively, Standard Retrieval, Support Retrieval, and Cloud Cleared Radiances. File sizes and the specific products in each file are shown in the table below. The multilevel products are marked with asterisks (*) and all files include geolocation information.

AIRS Level 1B Products	Volume (MB/file)	Horizontal Resolution
AIRS IR Radiance	122.1	15 km
AIRS VIS–NIR Radiance	21.0	2.3 km
AMSU–A Brightness Temperature	0.4	45 km
HSB Brightness Temperature	1.6	15 km
AIRS IR QA Subset	6.5	
AIRS VIS/NIR QA Subset	0.9	

AIRS Level 2 Products: Horizontal Resolution 45 km

Standard Retrieval: Volume = 4.6 MB/file, 28 levels*	Support Retrieval: Volume = 17.6 MB/file, 100 levels*
surface skin temperature	surface skin temperature
surface air temperature	surface air temperature
atmospheric temperature*	atmospheric temperature*
water vapor mass mixing ratio*	water vapor column density*
total precipitable water vapor	cloud liquid water*
ozone volume mixing ratio*	cloud ice or water flag*
total ozone burden	ice or snow concentration
spectral IR surface emissivity	ozone column density*
spectral IR surface bidirect reflectivity	carbon monoxide column density*
microwave surface brightness	methane column density*
microwave emissivity	outgoing longwave radiation
total cloud water	clear sky outgoing longwave radiation
cloud top temperature	cloud IR emissivity ratio
cloud top pressure	cloud IR reflectivity
effective cloud fraction	precipitation
geopotential height*	rain rate
geopotential height of surface	

Cloud Cleared Radiance:
Volume=25.8 MB/file

calibrated, geolocated AIRS IR radiances

AIRS data products can be ordered on line at no cost via the GES DAAC Search and Order interface or the EOS Data Gateway (EDG). Most recent data may also be obtained from the Data Pool, an online cache that provides FTP access for quick download. Daily summary browse images and preview images of individual data granules are also accessible from the search interfaces to help users evaluate data prior to ordering or downloading. Previewing an image of a granule can help confirm geographical location, determine the extent and location of cloud cover, or observe quality problems such as speckling, line drops, and sun glint. However, the images should not be used as the bases of any scientific research.

The URLs for AIRS data access are listed below. For assistance with ordering from the GES DAAC or EDG, please contact the GES DAAC User Services group at 301–614–5224 (toll free 877–422–1222) or send an eMail to help@daac.gsfc.nasa.gov.

- GES DAAC Search and Order:
  http://daac.gsfc.nasa.gov/data/dataset/AIRS/

a GES DAAC Data Pool:
  http://daac.gsfc.nasa.gov/data/datapool/AIRS/

- EOS Data Gateway:
  http://eos.nasa.gov/imswelcome/

The GES DAAC Atmospheric Dynamics Data Support Team (ADDST) led by Dr. Jianchun Qin will be providing science and data support to assist users in understanding, accessing, and applying the AIRS data products. The ADDST stays in close contact with the AIRS Science Team through weekly teleconferences and semi-annual meetings so that the latest knowledge and status of the AIRS project will be communicated to the general public. An extensive informational AIRS data support Web site has been prepared by the ADDST for data users at

http://daac.gsfc.nasa.gov/atmodyn/airs/

Services include links to product ordering and distribution, documentation, data visualization and analysis tools, channel and variable subsetting, and data format information. Furthermore, individual assistance can be obtained by sending eMail to the ADDST at atmdyn-dst@daac.gsfc.nasa.gov.

NOTE: In early spring 2003 problems appeared with the HSB instrument and it was placed in safehold. No HSB scientific data are taken when the instrument is in safehold. The experiment engineers and the AIRS science team are considering the problem. The science team is also studying the accuracy of the Level 2 and Level 3 sounding products, both with and without the HSB humidity measurements. Readers interested in further details concerning this problem should check with the AIRS science team (see reference below) or the AIRS data support Web site (see previous paragraph).

References

The AIRS Home Page contains information about the Science Team, product validation efforts, and much more

http://www-airs.jpl.nasa.gov/

"Aqua With AIRS Is Coming," *Global Scanner,* Summer 2000 issue. This article gives more details on how the GES DISC supports the processing of AIRS data products and interacts with the AIRS science team. Download *Global Scanner* back issues in PDF format from the new Issue Archive Index at

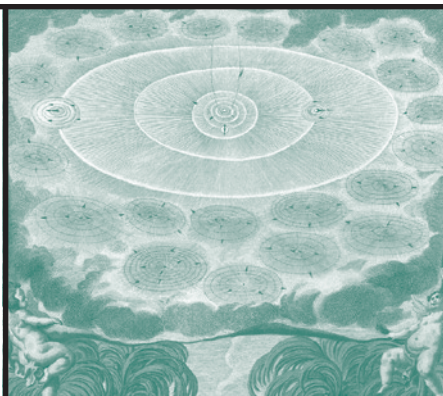http://daac.gsfc.nasa.gov/DAAC_DOCS/Newsletter

New Capabilities in the GES DAAC Operational System ECS Release 6A.07: Synergy III

by Karin Loya

The development contractor for the NASA Earth Observing System Data and Information System (EOSDIS) Core System (ECS) completed a major release of new capabilities. Known as "ECS Release 6A.07: Synergy III," it was delivered to the four EOSDIS Distributive Active Archive Centers (DAACs)[1] on January 31, 2003. This release incorporates fixes and enhancements to the ECS to realign baselines at those DAACs to synchronize them to a common baseline. This baseline realignment is necessary periodically to overcome baseline divergence and reduce maintenance costs induced by the different series of fixes and enhancements required to support unique operational scenarios at each DAAC. The Synergy III release also represents the past year's culmination of prototype development under the auspices of the Synergy program, intended to extend the public's use and increase the usability of the EOSDIS archive.

The Synergy program is ongoing, funded by Congress. Synergy I and II capabilities were delivered previously in 2001 and 2002; Synergy III was first released in November 2002 then rereleased in January with a fully integrated Order Manager component, a significant functional extension that streamlines the management of EOSDIS data orders.

The ECS development contractor, Raytheon, and its selected collaborative Earth Sciences partners, primarily universities, receive yearly funding to develop new capabilities that are deployed incrementally each year to the EOSDIS DAACs. Synergy partners develop user applications that add to the existing tool set for data mining, interpretation, and visualization of Earth Sciences data.

Synergy was designed to improve service to users while searching for and ordering data. The Synergy solution involves design changes to systems architecture, hardware, networks, and software components. ECS limitations that Synergy seeks to overcome are

- slow distribution times because of tape access
- inability to subscribe to data by spatial qualifiers (e.g., geographic region)
- complex user interface
- limited subsetting options.

To address those limitations, the system is designed around the concept of a Data Pool, a large, online cache of data (currently 55 TB at GSFC), that allows high performance user access. The architectural design of the Data Pool takes advantage of Storage Area Network (SAN) technology to provide fibre channel interconnect to support high speed data transfers. A component known as the Spatial Subscription Server (SSS) allows downstream users to subscribe to and receive data for specified spatial extents, rather than by date or time or by qualifying parameter. An easy-to-use drill-down Web interface that simplifies the user interface is available. Finally, an interface from ECS to externally provided subsetters (programs that extract subsets of data) is provided.

The new ECS 6A.07 features and capabilities that are relevant to the GES DAAC operational system are as follows:

Data Pool Enhancements—Synergy III allows population of the Data Pool from the ECS archive using the Batch Insert Utility, as well as the insertion of non-ECS data not previously specified to the ECS. A new feature allows data in the Data Pool to be grouped by user defined "themes" to facilitate ordering related data. The SSS includes enhancements to associate themes with Data Pool insert subscriptions. The Data Pool Web Interface in Synergy III enables compression of data on download and distribution and conversion of data from HDF-EOS to GeoTIFF format.

Bulk Metadata Generation Tool (BMGT) performance enhancements—BMGT supports export of the EOSDIS archive data to the EOSDIS Data Gateway (EDG) Clearing House (ECHO) client so that all EOSDIS archive holdings are searchable and can be ordered through ECHO. Synergy III streamlines BMGT performance to overcome the time it takes to download the large size of the current EODSIS archive inventory.

Order Management Subsystem (OMS)—OMS supports orders submitted via the V0 Gateway and through the SSS. It enables users to submit orders as long as the V0 Gateway and the Order Management Data Base are "up," thus eliminating impact of system outages on orders (i.e., orders are not lost). OMS offers users increased flexibility and control over orders by supporting resubmitting orders, editing orders, splitting large orders into smaller ones, limiting the number of granules and total volume for a given media type, and placing orders on hold by media type.

Synergy III Challenges for GES DAAC Staff

Any major system software release presents a challenge to the DAACs to assure that the risk to operational stability and performance is minimized. This is accomplished primarily through comprehensive and thorough testing. The January delivery presented some unique challenges. Several patches that fixed problems identified during the earlier November release were delivered in short succession immediately after the main delivery. As it turned out, 30 patches would eventually be provided during the 10-week testing cycle before the release could be approved by the Configuration Control Board (CCB) for promotion to "Ops Mode." The nearly continuous arrival of patches and the need to evaluate the "footprint" of each plus the potential impact to testing (e.g., the necessity of retesting and the extent of retesting required) presented a strategic challenge.

A second challenge was that ECS 6A.07 introduced Data Pool data base schema changes that had a major effect on some of the ~50 DAAC Unique Extensions (DUEs). The DUEs are GES DAAC developed software that extend interfaces and operational tools needed for smooth management of the 1.5 Petabyte EOSDIS archive. This effect was not anticipated, and it required reengineering of DUEs and retesting.

GES DAAC News

The third challenge in testing any release is staff resource limitations. Staff who support testing are one and the same as the skilled engineering, science, and operations staff who support the community. The priority of new release testing therefore falls below ECS operations, engineering and science support for keeping ECS operational at expected throughput levels, and maintaining a high standard of service to users of the operational system.

How the GES DAAC Met the Challenges

GES DAAC staff developed a thorough and improved testing strategy for the ECS custom code Release 6A.07 roll-up. Objectives included running an early "smoke test" based on end-to-end data flows to assess the basic health and stability of the release followed by comprehensive regression tests that included external client tests and tests of new functionality. It was decided to keep the test configuration up to date with patches so that at the end of the test period it would reflect the latest and greatest. The footprint of each patch was carefully examined before installation to understand what retesting might be required. Custom code installations were accomplished for both 6A.07 deliveries and the 30+ patches or test executables (1.4 million lines of custom code). Synergy III was carefully promoted to Operations on April 23, 2003.

A triage approach was taken for the DAAC DUEs to identify by criticality those that are essential to operations. Modifications and thorough testing were accomplished by distributing the work to the original developers and enlisting assistance from expert technical staff. Configuration Management staff supported configuration control of the DUEs and timely promotion of the priority DUEs to Ops Mode.

Priorities were juggled successfully by GES DAAC staff to respect the commitment to the user community for system availability, throughput, and services while preparing to release Synergy III as expeditiously as possible.

How the Release Went

After promoting Release 6A.07: Synergy III, its associated patches, and the DUEs into Ops Mode, engineering staff completed the 6A.07 checkout, and Operations

New Data Products

General News

People in the News

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NEW DATA PRODUCTS & SERVICES

Detailed information about the archived data holdings at the GES DISC can be found at

http://daac.gsfc.nasa.gov

In this section we emphasize important new happenings concerning our data holdings. These are arranged by data categories.

NEW TOOLS & FACILITIES FOR GES DAAC DATA USERS

DATA POOL OPERATIONAL

Remember that the Data Pool is operational for easy access to most recent data. The GSFC-ECS Data Pool is now accessible through the Goddard DAAC search and order engine, WHOM, which uses a familiar user interface to show and search the GSFC-ECS Data Pool holdings. For now, only a single granule at a time can be downloaded using WHOM. The Data Pool has not yet been populated to its full capacity of 50 TB.

http://daac.gsfc.nasa.gov/data/datapool/index.html

GES DISC PRINCIPAL DATA SETS

ATMOSPHERIC DYNAMICS

3-dimensional dynamic and thermodynamic state of the Earth-atmosphere system, from satellite measurements and assimilation systems.

AIRS and AMSU-A calibrated, geolocated radiances (Level 1B data) may now be ordered from the GES DAAC beginning with data date March 12, 2003. Also, cor-responding quality assurance information for AIRS (both visible and infrared products) is available from the GES DAAC. Along-track (Level 2) data products covering both surface and atmospheric properties are expected in July. For more details see this issue's feature article, "Atmospheric Infrared Sounder (AIRS) Data Products at GES DAAC."

HYDROLOGY

Global precipitation, its variability, and associated latent heating, important modeling and applications.

The Hydrology Data Support Team at the GES DAAC has implemented a new ASCII output function to our most popular Web application, TRMM Online Visualization and Analysis System (TOVAS). In addition to area and time series plots, this function allows users to output ASCII data for their selected area and time range. Since the launch of TOVAS, we have received numerous requests for ASCII output of precipitation data. This capability is now available at

http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/hydrology/TRMM_analysis.html

Please send your comments to the Hydrology Data Support Team at hydrology@daac.gsfc.nasa.gov.

MODIS DATA SUPPORT

Calibrated radiances and geolocations, higher level atmosphere and ocean color and sea surface temperature data.

As part of the EOS mission, the Terra and Aqua satellites were launched in December 1999 and in May 2002, respectively, and both satellites carry the Moderate-Resolution Imaging Spectroradiometer (MODIS)

instrument. The data from both MODIS instruments are made available.

Multi-Data Order Page — A convenient tool to order data from both MODIS instruments, including L1B channel and-Ocean parameter subsets, is available at

http://daac.gsfc.nasa.gov/daac-bin/MODIS/Data_order.pl?PRINT=1

OCEAN COLOR

Remote sensing ocean color data used to investigate ocean productivity, marine optical properties, and the interaction of winds and currents with ocean biology.

Science Focus! gets back into the swim of things with some remarkable imagery from the Arabian Sea in a discussion of monsoonal circulation effects entitled "The Ras al Hadd Jet: Stirring the Arabian Sea."

http://daac.gsfc.nasa.gov/oceancolor/science_focus.html

Also check out "An Enlightened View of Calcite in the Ocean With MODIS."

http://daac.gsfc.nasa.gov/oceancolor/calcite.shtml

MODIS Ocean Data Reprocessing — The MODIS Ocean Team, in conjunction with the calibration and characterization teams, is working to prepare for a "piggyback" reprocessing effort in conjunction with reprocessing of MODIS Terra Atmospheres data. While several issues are still being discussed, including unusual variability in both the land and oceans data, the team is working toward an initiation of the reprocessing in July and completion near the end of October. The reprocessing will eliminate many of the known causes of variability in the MODIS Terra Oceans data, and provide a scientific quality data set for the approximate period November 1, 2000, through March 2003.

Even though this reprocessing expects to provide improvements to the current MODIS Terra Oceans data, many of the ocean products in the currently available Collection 4 are validated and can be used for scientific research. MODIS Terra ocean color data are currently validated for the period November 1, 2000, through March 19, 2002, and the 11-micron sea surface temperature product is validated from November 1, 2000, to the present.

More HRPT SeaWiFS Data Results From Customer's Query — Early this year, Dr. Chuqun Chen of the South China Sea Institute of Oceanography asked us about

his data subscription. He wanted to know if we would be getting any more high resolution SeaWiFS data from the station located at the Hong Kong University of Science and Technology, which we know as station HKUS. Dr. Chen indicated to us that he knew the HKUS station was still in operation but wondered why we weren't receiving their data. So we sent a message to the station operators and found out that for various reasons the lines of communication between station HKUS and the SeaWiFS Project (which sends SeaWiFS data to us) had stopped working. A collaboration between John Wilding of the SeaWiFS Project and Jay-Chung Chen and Wei Huang of the Hong Kong University of Science and Technology resulted in the transfer of nearly 1.5 years worth of data files from this station. These new data cover the South China Sea and western Pacific Ocean near Taiwan and the Philippines, a region that was not well covered by any other HRPT stations. So we're very glad to get these data, and we hope they will benefit many of our users.

UPPER ATMOSPHERE

Ozone and other trace gas compositions, dynamics and energy interactions of the upper atmosphere.

SORCE Products Available Soon — The Solar Radiation and Climate Experiment (SORCE) spacecraft was successfully launched on Saturday January 25, 2003. SORCE is a NASA-sponsored satellite mission that will provide state-of-the-art measurements of incoming x-ray, ultraviolet, visible, near-infrared, and total solar radiation. The GES DAAC will archive the Level 0 raw data and the Level 3 calibrated solar spectral irradiance and the total solar irradiance data products. The Level 0 telemetry data are already flowing to the DAAC for archiving but not for release to the general public. The Level 0 data may be used in the future by the science teams if and when they decide improvements are needed in the Level 3 products. The science Level 3 products are expected to arrive at the DAAC a few months after launch. These will be available to the general public. For updates please check

http://daac.gsfc.nasa.gov/upperatm/

or see the SORCE homepage

http://lasp.colorado.edu/sorce/

Researchers may also find useful products in our other important data set collections.

FIELD EXPERIMENTS

Aircraft and ground based measurements of meteorological variables designed to improve science algorithms and validate satellite-derived data products.

INTERDISCIPLINARY

Global land, ocean and atmospheric parameters mapped to uniform spatial and temporal scales for basic research and applications studies.

LAND BIOSPHERE

Long time-series vegetation and thermal infrared brightness temperature data sets for global change research.

For more details about the GES DISC data holdings and to order data see our Home Page or contact us by eMail, phone, or fax.

http://daac.gsfc.nasa.gov/

For MODIS User Services
eMail: daac_usg@gsfcsrvr4.gsfcmo.ecs.nasa.gov
phone: 301–614–5473
fax: 301–614–5304
For other products' User Services
eMail: daacuso@daac.gsfc.nasa.gov
phone: 301–614–5224 or 1–877–422–1222
fax: 301–614–5304

GENERAL NEWS

New Data Products

Some data from the new Atmospheric Infrared Sounder (AIRS) and the Advanced Microwave Sounding Unit (AMSU–A) are presently available, and more products should be available shortly. See feature article "Atmospheric Infrared Sounder (AIRS) Data Products at GES DAAC."

The instruments on the new SORCE satellite are presently taking important solar data. Calibrated solar measurements will soon be available from the GES DAAC. See the Upper Atmosphere item in the New Data Products section.

Meetings, Publications, and Presentations

GES DAAC staff attend meetings to explain the data products and tools available

at the Goddard Earth Sciences Archive and to make presentations on specific items.

Presentations Planned For July

1. Coastal Zone '03, July 13–17, Baltimore.

Acker, J.G., W. Esaias, G. Feldman, and S. Kempler. 2003. "Coloring the Coastal Zone: SeaWiFS and MODIS Data for Aquatic Resources Management."

2. IGARSS'03, July 21–25, Toulouse, France

Savtchenko, A., D. Ouzounov, A. Gopalan, D. Yuan, D. Nickless, and D. Ostrenga. 2003. "MODIS Data From Terra and Aqua Satellites."

Yuan, D., and A. Savtchenko. 2003. "Horizontal Sea Surface Temperature Gradients: MODIS Satellite Observations Versus Reynolds Analysis."

Presentations Given

1. International Workshop on Earth Systems Interactions, Indian Institute of Technology (IIT), January 23–31, Kanpur, India.

Ouzounov, D. 2003. "Earth-Atmospheric Coupling During Strong Earthquakes by Analyzing IR Remote Sensing Data."

Ouzounov, D. 2003. "Mid-Infrared Radiation, Electric Charges and Acoustic Emission During Rock Deformation."

2. MODIS Ocean Data Workshop, University of New Hampshire, February 3–4, Durham, NH.

Nickless, D. 2003. "Ordering MODIS Ocean Data Products from the GES DAAC."

3. American Meteorological Society (AMS), February 9–13, 2003, Long Beach, CA.

Li, J. 2003. "Atmospheric Infrared Sounder Data at the NASA GES DAAC."

Liu, Z., H. Rui, W. Teng, and L. Chiu. 2003a. "Online Analysis and Visualization of TRMM and QuikSCAT Products."

Liu, Z., H. Rui, W. Teng, and L. Chiu. 2003b. "Online Intercomparison of TRMM and Other Global Gridded Precipitation Products."

Pollack, N., W. Teng, J. Bonk, L. Lu, D. Nadeau, P. Hrubiak, and G. Serafino. 2003. "An Interoperable Web Mapping Application at the GES DAAC."

Rui, H., B. Teng, J. Bonk, L. Chiu, Z. Liu, P. Hrubiak, N. Pollack, and L. Lu. 2003. "TRMM Data Reprocessing and New Data Products."

4. USWG/AAG, March 4–7, New Orleans.

Pollack, N., W. Teng, J. Bonk, L. Lu, D. Nadeau, P. Hrubiak, and G. Serafino. 2003. "An Interoperable Web Mapping Application at the GES DAAC."

5. The GES DAAC presented three papers at the EGS-AGU-EUG Joint Assembly, April 6–11, Nice, France.

Yuan, D. and A. Savtchenko. 2003. "Horizontal Sea Surface Temperature Gradients: MODIS Satellite Observations versus Reynolds analysis."

Johnson, J., and S. Ahmad. 2003. "SORCE Data Products and Services at the NASA GES DAAC."

Qin, J., S. Cho, J. Li, C. Phelps, and D. Sun. 2003. "Atmospheric Infrared Sounder Data at NASA GES DAAC."

6. Ocean Color Research Team (OCRT) Meeting, April 15–17, Miami.

Nickless, D. 2003. "Ordering MODIS Ocean Data Products From the GES DAAC."

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loaded the system with full ingest, production, and distribution to begin the period of operational performance testing. (Because of resource constraints of the test modes, the final performance testing occurs in Ops Mode.) Within a week's time, after intensive periods of troubleshooting throughout the week by the operations and engineering staff, the ECS system had stabilized and normal production throughputs were attained. The period of less than nominal performance was minimized thanks to the dedication and diligence of the staff and the responsiveness of the development contractor.

The new OMS was turned on May 14th, after ECS 6A.07 stability was established and OMS specific fixes were installed. Operations staff began exploring the key new functionality that gives operators the ability to filter, inspect, or edit any data order entering the system and allows more efficient packaging and distribution of data orders.

The GES DAAC now automatically writes over 1 TB of data per day to the Data Pool while concurrently deleting 1 TB of older data. The Data Pool holdings are maintained at approximately 50 TB (our chosen threshold).

As the Data Pool represents a fixed capacity, GES DAAC has the ongoing responsibility for the content and associated data retention, which are configurable. GES Data Specialists work with EOSDIS instrument teams to establish the Data Pool allocations that best represent their archival and distribution needs based on user priorities and usage levels. Staff also identify what data need to be retained and for how long according to projected use of the

data. The GES DAAC operations staff is responsible for the ongoing monitoring, management, and maintenance of the Data Pool and for its optimization to best meet the needs of the extended community of data users.

ECS Release 6A.07 will continue to be the operational release for some time and is expected to provide a stable environment for upcoming MODIS and AIRS reprocessing campaigns, for AURA MOSS-2 in July, and for the first-time archival of TRMM data in the ECS! The work goes on, though — ECS Release 6A.08 is already in progress, and the requirements analysis and design for Synergy IV are already ramping up!

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[1] The NASA DAACs using the EOSDIS Core System are
    Goddard Space Flight Center (GSFC) Earth Sciences (GES) DAAC, Greenbelt, MD
    Land Processes DAAC (LP DAAC), at the Eros Data Center (EDC), Sioux Falls, SD
    NSIDC DAAC (National Snow and Ice Data Center), Boulder, CO
    NASA Langley DAAC, at the Langley Research Center (LaRC), Hampton, VA (this is also sometimes referred to as the Atmospheric Sciences DAAC)
    Links to these and some other Earth science data centers can be found at http://daac.gsfc.nasa.gov/DAAC_DOCS/external_datasets.html
    The Goddard DAAC home page is: http://daac.gsfc.nasa.gov/

7. ASPRS 2003 Annual Conference and Technology Exhibition. May 5–9, Anchorage, AK.

Pollack, N., W. Teng, J. Bonk, L. Lu, D. Nadeau, P. Hrubiak, and G. Serafino. 2003. "A Web Interface for Accessing GES DAAC GIS Data."

People in the News

Personality Sketch: William L. (Bill) Teng

Bill joined the DAAC in 1995 (as a Hughes STX employee), initially (first year) working with Peter Smith on the Pathfinder AVHRR Land data set and then with Bruce Vollmer on MODIS science software integration and testing (SSI&T) during the days of IR-1 (Interim Release 1). In the summer of 1996 he was asked to take over the lead of the newly formed Hydrology Data Support Team (HDST), with the primary focus on TRMM, the wildly successful (his totally unbiased opinion) Tropical Rainfall Measuring Mission. HDST was an integral part of an 8-month DAAC effort to build and prepare the operation of the TRMM Support System (TSS), after the originally planned system encountered schedule delays. At the time, TRMM's nominal data volume of 30 GB a day and 30 TB over the mission life was the largest ever at the DAAC.

HDST and the V0 Engineering group developed the first (TRMM) Web Hierarchical (data) Ordering Mechanism (WHOM), which was released to the public in June 1998. Another first by the HDST was the introduction of the first DAAC Geographical Information System (GIS) product, the Gridded TRMM Combined Instrument (TCI) Rainfall, subset for New Mexico (RG2B31), in shapefile format. In 1999, when Bruce Vollmer became a civil servant, Bill took over as the contractor (Raytheon ITSS) Science Support Section Lead, his current position, emphasizing customer focused science data support.

Before joining the DAAC Bill worked in Codes 975 (Microwave Sensors Branch) and 974 (Hydrological Sciences Branch), where he conducted research on visible, infrared, and microwave remote sensing for soil moisture, vegetation, and other terrain characteristics. He participated in two NASA field campaigns, one of which (Washita '92) was a precursor to Southern Great Plains (SGP) '97 and '99; SGP data are archived at the DAAC.

Before coming to the Goddard Space Flight Center, Bill was twice a civil servant for two federal agencies, the U.S. Department of Transportation, Federal Highway Administration, and the U.S. Department of Agriculture, Foreign Agricultural Service. For the latter, he used satellite and other ancillary data to provide near real-time assessments of U.S. crop development and condition. He participated in many crop tours, during several of which he engaged in unplanned maze walks after getting lost in the corn fields. This was before the days of commercial corn field mazes.

Between his two stints with the federal government, Bill did a post-doctoral fellowship at the Smithsonian Institution's National Air and Space Museum, on the third level of which reside the museum research staff, including those of the Center for Earth and Planetary Studies where he was located. During the year or so there, he conducted remote sensing and field research on land degradation in New Mexico.

Bill obtained his Ph.D. at Cornell University (in Civil & Environmental Engineering), where he also earned his MS and BS degrees. His dissertation research was on the use of remote sensing for mapping landforms and soils in the strikingly beautiful deserts of the American southwest, where he spent many a starry night in a tent, under the saguaro, listening to the meditative music of the desert night. He spent several months over 2 years doing fieldwork in the various deserts of New Mexico, Arizona, and California. It was quite hot digging soil pits in 100 degree weather. ("Yeah, but it was dry heat." "Yeah, right.") He occasionally splurged and stayed at a Motel 6 to clean up a bit.

Bill had the good fortune to have had an incredibly fine writer as a member of

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his Ph.D. committee, who was an absolute stickler for proper English and writing and who instilled in Bill the critical importance of language. Seeing red all over that first returned homework assignment was quite traumatic. This training by fire came in very handy when he served as the author-editor for the "Fundamentals" chapter of the *Manual of Photographic Interpretation,* published in 1997 by the American Society for Photogrammetry and Remote Sensing.

During his Ph.D. years, Bill also ran his only marathon (so far). The marathon and the Ph.D. are two key — and interestingly similar — events in his life (before he got married), not so much for their end results (of which he's certainly quite proud), but for what he learned through the process. They have served him well throughout his career and life in general.

Bill was born in Taiwan, China, emigrated with his family to the U.S. early in his childhood, and grew up with the Yankees in the Bronx (NY). He is married and has two children. On his office wall are various artworks by the kids to help him keep his priorities straight. His typical day is bracketed by running in the early morning and violin practice in the late evening, with reading and being with the family whenever there's free time in between.

these are examples of the youthful fine art that graces Bill's office walls

stop by to view their lovely colors

Welcome Old Timers!

Three of our staff have recently taken on new responsibilities and duties.

Greg Leptoukh has moved from SSAI Manager of Science Integration to be a civil servant as GES DISC/DAAC Lead Data Manager. He will be Data Support Manager of five discipline specific Data Support Teams. His SSAI replacement is TBD at this time.

Steve Berrick has moved from SSAI as Lead of Science Software Integration and Test activities to be a civil servant in the GES DISC/DAAC engineering group. William Smith will take over as lead of Science Software Integration and Test activities.

Best Wishes

go north to **Carrie Phelps** who is presently in Connecticut. She will still be telecommuting to the GES DAAC for a while, so her good work for us will continue. See her AIRS feature article in this issue.

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